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stent same weld$ adj9 connect$	22

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USPT	weld$ same connector$ stent	14368	L1

Document Number 10

Entry 10 of 22 File: USPT Jul 7, 1998

DOCUMENT-IDENTIFIER: US 5776161 A
TITLE: Medical stents, apparatus and method for making same

BSPR:
According to the prior art method of manufacturing stents, the material is originally flat. The screen-like material is then rolled into a cylinder shape and laser welded or otherwise connected to form a tube--the weld running the length of the longitudinal axis. This is a difficult and expensive manufacturing procedure. It also leads to a potential lack of uniformity. The present invention, a new method of stent manufacture, as will be explained, results in a more uniformly expandable stent, one not having a weld line formed after mesh formation.

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Document Number 16

Entry 16 of 22 File: USPT Oct 8, 1996

DOCUMENT-IDENTIFIER: US 5562697 A
TITLE: Self-expanding stent assembly and methods for the manufacture thereof

BSPR:
Whereas this prior art device is capable of percutaneous implantation, e.g. in the biliary duct, and is effective for permanent prevention of ingrowth of a tumor between the struts of the segment due to the flexible sleeve, it suffers from various practical disadvantages. On one hand, the manufacture is relatively complicated due to the welding or soldering operation required for forming the eyes at the joints of the struts and the mutual connection of stent segments by tying the eyes of two stent segments positioned end to end with thread. Since proper implantation requires the stent assembly to be able to resist contraction along the axis, application of the sleeve material to the stent segments must take place in the compressed condition of the latter.

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Document Number 5

Entry 5 of 22 File: USPT Oct 6, 1998

DOCUMENT-IDENTIFIER: US 5817152 A
TITLE: Connected stent apparatus

ABPL:
An endoprosthetic device comprises at least two short stent segments welded together to form a connected stent. Each stent segment defines a single wire having straight sections integrally formed between axial turns. The welds are placed between stent segments at one or more aligned adjacent axial turns. The welded connected stent is flexible enough to allow it to pass through sharp turns and to be implanted to conform to the contour of the lesion to be treated. In one aspect of the invention all adjacent axial turns are welded together. In another aspect of the invention, selected adjacent axial turns are welded together to create a generally balanced spiral pattern of welds surrounding the cylindrical connected stent.

BSPR:
Alternatively, for increasing the flexibility of three or more welded stent segments, the number of welds is decreased by welding in a substantially spiral, or alternating pattern which does not include welds at all adjacent crowns. In this embodiment, the stent segments themselves are sufficiently flexible to enable the connected stent to maneuver through and conform to the often tortuous vessels requiring treatment. The preferred embodiment uses stent segments having four crowns at each end with welds at each adjacent crown area of the connected stent. The stent segments having at least one pair of axially aligned adjacent crown areas.

BSPR:
One more specific object of the present invention is to provide a connected stent comprised of at least three short stent segments wherein the welds form a spiral or alternating pattern around the generally circular, or elliptical, connected stent thereby welding at a single adjacent crown area in each plane of the stent.

BSPR:
An additional object of the present invention is to provide a connected, welded stent having stent segments sufficiently flexible so that a spiral or alternating pattern of rigid welds allows the connected stent to be maneuvered through and implanted in highly curved vessels.

DRPR:
FIG. 5 is a side view of a preferred connected stent having four stent segments connected by a pattern of welds spiraling around the connected stent.

DEPR:
As shown in FIG. 2, welds 30 may be placed at each adjacent crown 14 area around the cylindrical connected stent, and four welds 30 are shown. Alternatively as best shown in FIG. 5, welds 30 may be placed at only one adjacent crown pair between two adjacent stent sections

10. FIG. 5 shows a connected stent 20' having four stent segments 10. The welds 30 form a spiral pattern around the cylindrical stent 20'. The spiral pattern shown in FIG. 5, or an alternating pattern, reduces the number of welds 30 thereby maintaining the flexibility of the connected stent 20'.

DEPR:
It will be recognized by those skilled in the art that the number of axial turns (crowns 14) in each stent segment 10 may vary, generally between two and ten with the optimum being four to seven, and that the number of welds 30 may vary accordingly. At least one weld 30 is required to connect two stent segments 10, and it is preferable to space welds in a balanced fashion in the spiral or alternating configuration. Alternatively, the welds 30 may be selectively placed to more easily selectively configure a connected stent to the contours of the vessel to be treated.

DEPR:
Due to the conformability of the single weld connected stent, not only can varying lesion lengths be treated, but curved vessels and multi-curved vessels may also be treated.

DEPR:
Once the configuration of the connected stent has been selected and the stent is welded to form the selected configuration, the connected stent may be crimped onto a balloon of a balloon catheter device for delivery to the affected region of a vessel such as a coronary artery. Once the balloon is in place across the lesion, using conventional imaging techniques and radiopaque dyes, the balloon may be inflated, again substantially in a conventional manner, to deploy the connected stent. In selecting a balloon, it is helpful to ensure that the balloon will provide radially uniform inflation so that the connected stent will expand equally along each of the segments. The inflation of the balloon causes the expansion of the stent. The amount of inflation, and commensurate amount of expansion of the connected stent, may be varied as dictated by the lesion itself, making the connected stent of the present invention particularly flexible in the treatment of chronic restenosis.

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